

WHAT IS CLAIMED IS:

1. An elevator system comprising:  
an elevator hoistway defined by surrounding structure;  
an elevator car and counterweight located in the hoistway; and  
a drive motor including a drive sheave located at a bottom portion of  
the hoistway, the drive motor being coupled to the elevator car and the  
counterweight via at least one flat rope for moving the elevator car upwardly and  
downwardly along the hoistway.
- sp 1 2. An elevator system as defined in claim 1, wherein the at least  
one flat rope includes a suspension rope coupled to the elevator car and the  
counterweight, and a drive rope engaging the drive sheave for moving the elevator  
car along the suspension rope.
- sp 1 3. An elevator system as defined in claim 2, wherein the  
suspension rope is coupled at its first and second ends within an upper portion of  
the hoistway.
- sp 1 4. An elevator system as defined in claim 2, further including at  
least one elevator sheave coupled to an underside of the elevator car, a deflector  
sheave coupled within an upper portion of the hoistway, and a counterweight  
sheave coupled to a top portion of the counterweight, the suspension rope having  
its first and second ends coupled within an upper portion of the hoistway, the  
suspension rope extending downwardly from its first end, underslinging the  
elevator car via the elevator sheave, extending upwardly and looping about the  
deflector sheave, extending downwardly and looping about the counterweight  
sheave and extending upwardly and terminating at its second end.
- D 1 5. An elevator system as defined in claim 2, further including a  
deflector sheave located at a lower portion of the hoistway, and wherein the drive  
rope has first and second ends, the drive rope having its first end coupled to a  
bottom portion of the counterweight and its second end coupled to a bottom  
portion of the elevator car, the drive rope extending downwardly from its first end,  
looping about the drive sheave, extending toward and looping about the deflector  
sheave and extending upwardly and terminating at its second end at the bottom  
portion of the elevator car.

*✓* 6. An elevator system as defined in claim 5, further including a tension applying mechanism for imparting a downward force on the deflector sheave in order to maintain the drive rope in a taut condition.

*SP 1,a*  
7. An elevator system as defined in claim 6, wherein the tension applying mechanism includes a weight suspended from a tension spring, and a rigid connector pivotally coupled at a first end to the drive sheave, coupled at a second end to the weight and coupled between its first and second ends to the  
5 deflector sheave, whereby the weight imparts a downward force on the deflector sheave in order to maintain the drive rope in a taught condition.

*I,b*  
8. An elevator system as defined in claim 6, wherein the tension applying mechanism includes a rigid connector having first and second ends, the rigid connector being pivotally coupled at its first end to the drive sheave and coupled between its first and second ends to the deflector sheave, and a tension spring coupled at a lower end within a lower portion of the hoistway and at an upper end to the second end of the rigid connector, whereby the spring imparts a downward force on the deflector sheave in order to maintain the drive rope in a taught condition.

*I* *Spans & loops again*  
9. An elevator system as defined in claim 2, further including a deflector sheave located at a lower portion of the hoistway, and wherein the drive rope has first and second ends, the drive rope having a first end coupled to a bottom portion of the counterweight and a second end coupled to a bottom portion of the elevator car, the drive rope extending downwardly from its first end, looping about the drive sheave, extending toward and looping about the deflector sheave and extending toward and looping about the drive sheave, extending toward and looping about the deflector sheave, and extending upwardly and terminating at its second end at the bottom portion of the elevator car.

*T* 10. An elevator system as defined in claim 9, further including a tension applying mechanism for imparting a downward force on the deflector sheave in order to maintain the drive rope in a taut condition.

*I,a*  
11. An elevator system as defined in claim 10, wherein the tension applying mechanism includes a weight suspended from a tension spring, and a rigid connector pivotally coupled at a first end to the drive sheave, coupled at a second end to the weight and coupled between its first and second ends to the

5 deflector sheave, whereby the weight imparts a downward force on the deflector sheave in order to maintain the drive rope in a taught condition.

X 12. An elevator system as defined in claim 10, wherein the tension applying mechanism includes a rigid connector having first and second ends, the rigid connector being pivotally coupled at its first end to the drive sheave and coupled between its first and second ends to the deflector sheave, and a tension spring being coupled at a lower end within a lower portion of the hoistway and at an upper end to the second end of the rigid connector, whereby the spring imparts a downward force on the deflector sheave in order to maintain the drive rope in a taught condition.

13. An elevator system as defined in claim 2, wherein the suspension rope and the drive rope are made of non-metallic fiber material.

14. An elevator system as defined in claim 2, wherein the suspension rope and the drive rope are made of urethane.

X 15. An elevator system as defined in claim 1, further including at least one elevator sheave coupled to an underside of the elevator car, first and second deflector sheaves coupled within an upper portion of the hoistway, and a counterweight sheave coupled to a top portion of the counterweight, the flat rope having its first and second ends coupled within an upper portion of the hoistway and extending downwardly from its first end, underslinging the elevator car via the at least one elevator sheave, extending upwardly and looping about the first deflector sheave, extending downwardly and looping about the drive sheave, extending upwardly and looping about the second deflector sheave, extending downwardly and looping about the counterweight sheave and extending upwardly and terminating at its second end.

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## **ABSTRACT OF THE DISCLOSURE**

- An elevator system includes an elevator hoistway defined in a surrounding structure, such as a building. An elevator car and counterweight are located in the hoistway. A drive motor and associated drive sheave are disposed at 5 a bottom portion of the hoistway. The drive motor is coupled to the elevator car and the counterweight via at least one flat rope for moving the elevator car upwardly and downwardly along the hoistway.